

The chapters dealing with the theory of single phase and polyphase meters is complete and satisfactory. All the best known methods of measuring alternate current power are described. A matter of some importance is the effect of wave shape on the accuracy of registration; errors due to this cause may amount to 5 per cent. or more with meters of the induction motor type when running on non-inductive load, while the same meters record quite accurately when supplied with a sine wave of potential difference. The chapter dealing with tariff meters is full of useful information for the central station engineer, and the subject is well treated. The Hopkinson doctrine (one might almost call it an axiom) that "the charge for a service rendered should bear some relation to the cost of rendering it" is fundamental, but one of the chief disadvantages in its application in the Wright maximum demand system is, as Mr. Solomon says, that "the average consumer experiences considerable difficulty in understanding it, and the attitude of the consumer cannot be ignored."

Chapter xi. gives a description of a large number of pre-payment meters, and in the next chapter tariff and hour meters are dealt with in the same way. In the penultimate chapter some special mechanical features in meter design are described, for the obvious reason that "the proper working of a meter depends on its mechanical as well as its electrical design." The subject of meter testing is discussed at some length in the last chapter.

The book should be of great value both to students and to central station engineers who wish to know something about the instruments in use on their supply systems.

#### A NEW VOLUME OF THE "FAUNA OF BRITISH INDIA."

*The Fauna of British India, including Ceylon and Burma.* Published under the authority of the Secretary of State for India in Council. Edited by Lieut.-Colonel C. T. Bingham. Rhynchota, vol. iii., Heteroptera-Homoptera. By W. L. Distant. Pp. xiv + 503; figs. 266. (London: Taylor and Francis, 1906.)

THE present series of works was initiated and carried on for upwards of twenty years under the able editorship of the late Dr. W. T. Blanford, and as this is the first volume issued under the supervision of his successor, Lieut.-Colonel C. T. Bingham, this seems to be a fitting opportunity to summarise the progress that has already been made. In Vertebrates eight volumes have appeared—one on Mammalia, by W. T. Blanford; four on Birds, by Eugene W. Oates and W. T. Blanford; two on Fishes, by Francis Day; and one on Reptilia and Batrachia, by G. A. Boulenger. In Invertebrates ten volumes have appeared—one on Butterflies, by C. T. Bingham; four on Moths, by G. F. Hampson; two on Hymenoptera, by C. T. Bingham; one (half-volume) on Arachnida, by R. I. Pocock; and two on Rhynchota, by W. L. Distant.

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Respecting future arrangements, Colonel Bingham announces that four volumes on Beetles (including a volume on Phytophaga, by M. Jacoby), a second volume on Butterflies, by Colonel Bingham, and a volume on Land Shells, by the late Dr. Blanford and Colonel Godwin-Austen, are in preparation, of which it is hoped that the volume on Butterflies and a half-volume on Longicorn Beetles may be issued during the current year.

Turning from this highly satisfactory record of progress to the volume before us, we find that it concludes the suborder Heteroptera (the true Bugs), with families 17 to 24, Anthocoridae, Polycetenidae, Pelenonidae, Nipidae, Naucoridae, Belostomatidae, Notonectidae, and Corixidae, including collectively sixty-two species; and commences the suborder Homoptera with the families Cicadidae and Fulgoridae, of which collectively 570 species are described. There still remain three families of Trimerous Homoptera—Membracidae, Cercopidae, and Jassidae—to be dealt with in a future volume, as well as the Dimera and Monomera, comprising the families Psyllidae, Aphididae, Aleurodidae and Coccidae. With the exception of the Anthocoridae and the curious bat-parasite *Polycetes lyrae*, Waterh., the Heteroptera described in this volume are all aquatic, including the curious water-scorpions, water-boatmen, and the great *Belostoma indicum*, Lep. and Serv., which attains a length of three and a half inches, and is perhaps the largest heteropterous insect found in India, though some of the allied South American species are larger.

Our British species of the suborder Homoptera, of which the froghoppers may be taken as typical, are all small insects, the largest, our only British representative of the true Cicadidae (*Cicadetta montana*, Scop.), a scarce and local insect, only measuring an inch and a quarter across the wings. But many of the Indian species of Cicadidae and Fulgoridae are much larger, the largest Indian Cicada, *Pomponia intermedia*, Dist., measuring seven inches across the wings.

Although many species of Cicadidae are more or less spotted, and more or less opaque towards the base, yet the tegmina and wings are, in most instances, almost entirely transparent. In a few species, however, they are opaque, and brightly coloured. But in the Fulgoridae, or Lantern-flies, many of which are of considerable size, measuring two or three inches in expanse, the wings are often opaque, and varied with such bright colours that they might easily be mistaken for butterflies or moths by persons ignorant of entomology. Indeed, one species, *Aphana caja*, Walk., has received its name from its superficial resemblance to a tiger-moth.

Many Fulgoridae exude a white waxy substance, which is sometimes very abundant and conspicuous. Others, such as the true Lantern-flies or Candle-flies, are conspicuous both for their bright colours and for the long projection on the head of many of the species. Some have short wings, others very long and narrow ones. Mr. Distant's figures are without colour, but they give a very good idea of the wing-

venation and curious forms of a very interesting but still much neglected group of insects. These figures have been drawn by Mr. Horace Knight in his usual admirable style.

We have much pleasure in commending this volume (in which a large number of new genera and species are figured and described) to all entomologists who are interested in exotic insects. W. F. K.

#### OUR BOOK SHELF.

*Plants and their Ways in South Africa.* By Bertha Stoneman. Pp. ix+283. (London: Longmans, Green and Co., 1906.) Price 3s. 6d.

THE schools in Cape Colony and in other South African colonies are already indebted to the publishers of this volume for several useful educational books. Although this book, and one on geology, are the only ones issued under the title of the "South African Science Series," Messrs. Longmans have previously published an elementary botany and a book on South African flowering plants. The present volume by Miss Stoneman is written for younger children than the two former. The treatment of the subject on an elementary physiological and ecological basis is quite the most suitable, and the author displays considerable originality, although at times she develops a crudity of expression.

A chapter on seeds forms the introduction to the physiological considerations of growth; leaves and their functions are then discussed, and four ecological chapters precede the morphology of flowers, fruits, and seeds. The latter half of the book is devoted to classification, limited wisely to a description of the principal orders, and the writer has drawn up tables for differentiating all the genera mentioned; these are exceedingly useful, but the key for distinguishing the orders according to Bentham and Hooker's system, and the synopsis based on Engler's arrangement, would be more suitable for advanced students.

One of the chief merits of the book lies in the natural manner in which rather difficult subjects, such as the law of correlation of growth, are introduced; also every opportunity is taken to base instruction on practical experiment. Certain mistakes or mis-statements occur that might have been avoided with a little more circumspection, and the mis-spellings are more numerous than is consistent with careful reading; but these defects are slight, whereas the author has succeeded in giving plenty of character to the book, and has written with the object of stimulating observation and inquiry on the part of the reader. The book is well supplied with illustrations, of which a fair proportion has been specially drawn or prepared.

*Lectures on Compass Adjustment.* By Captain W. R. Martin. Pp. 98; with three charts. (London: George Philip and Son, Ltd., 1906.) Price 5s. net.

IN this book is reproduced a series of eight lectures on compass adjustment in iron and steel ships, delivered at the Royal Naval College, Greenwich, to the classes of senior officers as well as to navigating officers up to the year 1902. There can be no question that these lectures, profusely illustrated by diagrams and supplemented by practical instruction by means of models, were in many ways of great value to officers whose career was bound up with the navigation of ships, where the compass might be either a treacherous guide or a means of safety when adjusted and cared for as the author describes. No doubt the lecturer was able to answer questions asked

by his audience and to enlarge upon difficult points to their mutual advantage, but now, when these aids are absent and the student has to read lectures with modified diagrams, it is incumbent on the author of them to write clearly and with precision.

Turning, however, to the text, it can hardly be said that the author has succeeded in making his meaning sufficiently clear in many places. Among the more important of these the following require mention:—"The magnetic force of the earth is of course everywhere acting in only one direction" (the italics are the author's), a very misleading assertion. The expression "the line of dip is horizontal at the magnetic equator" is unsatisfactory. Again, what is the student to understand from the words, "the compass, may be regarded as a north seeking particle"?

In lecture vi., following wrong premises, it is stated that at a steering compass in H.M.S. *Powerful* the coefficient  $\lambda=0.790$  would be increased to 0.968 after correction by spheres. To obtain such an increase of directive force has long been eagerly sought after in vain, but, unfortunately, observation in the present case shows that a value of about 0.830 is near the truth after correction. Again, the results of observations made as described on p. 70 could not be used in constructing chart No. 1 with any degree of accuracy. With the large number of observations from observatories and results obtained with absolute instruments in the field, as well as relative observations at sea, there is no need to trust to inferior results.

The last lecture is devoted to the methods of adjusting a compass with large errors, but it must be remarked that the directions given are not generally agreeable with the practice of recent years. For example, for all purposes connected with the heeling error, the dip circle has long been discarded in favour of the heeling-error instrument.

Finally, it will be observed that the equipment of torpedo-boat destroyers and torpedo-boats with the liquid compass is not referred to. This is probably an unintentional omission which may be remedied in future editions of this work.

E. W. C.

*Lotus Blossoms. A Little Book on Buddhism.* By Maung Nee. Pp. vi+103. (Rangoon: Printed Privately, 1906.)

A DAINTY booklet in which a number of passages from various Buddhist writings have been gathered together under different headings. As indicative of the high tone and lofty character of the teaching in the Buddhist writings, the following sentences may be quoted: "Strive with all your strength, and let not sloth find a place in your hearts." "The wise man does not remain standing still where he has made a beginning, but ever reaches forward towards fuller enlightenment." "Idleness is a disgrace." These are classed under the heading "correct aim," but equally sound morality can be read in all the sections.

*Hydrographic Surveying. Methods, Tables, and Forms of Notes.* By S. H. Lea. Pp. 172. (New York: Engineering News Publishing Company; London: Archibald Constable and Co., Ltd., 1905.) Price 8s. net.

THIS is an excellent volume, and thoroughly describes the more complicated branch of hydrographical work, such as rivers, lakes, &c. The book touches very lightly on ocean surveying, and apparently is not intended as a work on this subject. Several of the terms used are not often met with in English works, being American technical terms; but these soon become familiar, and, as usual, are very descriptive and to the point.

H. C. LOCKYER.